EFFECT OF A COMMUNITY BASED INTERVENTION PROGRAMME ON THE PREVALENCE OF REPRODUCTIVE TRACT INFECTIONS IN RURAL TAMILNADU.

DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT OF THE DR. M.G.R. MEDICAL UNIVERSITY FOR THE DEGREE OF M.D. BRANCH XV – COMMUNITY MEDICINE EXAMINATION TO BE HELD IN MARCH – 2007

CERTIFICATE

This is to certify that "Effect Of A Community based Intervention Programme on The Prevalence Of Reproductive Tract Infections In Rural Tamilnadu." is a bona fide work of Dr. Savita Sanghi in partial fulfillment of the requirements for the M.D. Community Medicine examination (Branch XV) of The Tamilnadu Dr. M.G.R. Medical University to be held in March 2007.

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1 . INTRODUCTION AND JUSTIFICATION

Reproductive tract infections are an important public health problem in developing countries. The World Health Organization estimated that there were 340 million new cases of curable STIs throughout the world during 1999 in men and women aged 15- 49 years.[1] RTIs that are not sexually transmitted are considered even more common.[2] These infections present major health , social and economic problems [3,4] especially for women of a low socio - economic background . As STIs are known to increase the transmission of HIV , the control of these infections becomes even more crucial.

Inspite of the magnitude of the problem, there are many obstacles to the effective treatment of RTIs. Women's reluctance to discuss these matters, unbalanced gender relations, lack of decision making and a heavy work-load inhibit appropriate health seeking behaviour.[5, 6, 7] Poor quality care provided by inaccessible and insensitive health services are additional barriers.[8] Intervention efforts to prevent and control RTIs should take into consideration the full range of underlying factors that inhibit access to quality health care .[9]

The International Conference on Population and Development at Cairo in 1994 and the 1995 Beijing Women's Conference marked a critical transition in the approach to reproductive health. There was a shift from a primary emphasis on achieving country-level demographic targets to improving women's health through a wider range of sexual and reproductive health initiatives.[10] The Government of India's commitment to policy change following ICPD 1994 has recently resulted in a move towards the provision of comprehensive , integrated reproductive health care at all levels of the health sector.[8] The

management of RTI's was incorporated into the RCH programme which aims to provide need based, client centred , demand driven, high quality and integrated services. Inspite of a strong commitment to comprehensive reproductive health care; control of STI's / RTI's in India continues to be inadequate.[12, 8] A district level household survey conducted in Karnataka, Kerala and Goa by the Population Research Centre at the Institute for Social and Economic Change showed a low level of awareness regarding RTIs.[13] There is an urgent need to develop and evaluate community based interventions aimed at reducing the prevalence of RTIs .

The Community Health and Development Programme of Christian Medical College, Vellore , has been working closely with the community to improve its health and socioeconomic status, especially that of women. It provides primary and secondary level health care to a population of around 1,10,000 in Kaniyambadi block. A baseline study done among married young women in 1996–97 found a high prevalence of reproductive tract infections. [14] In response to the findings of this study, CHAD has adopted a comprehensive community based interventional strategy to reduce the burden of RTIs. Health education providing information on RTI's is provided to adolescents in school health programmes, out -of-school youth and to young married couples. Regular mass education campaigns are held in the villages. The health team offers counseling on risk reduction both at the hospital and during home visits. In an attempt to expand health care services for early diagnosis and prompt treatment to the community level, village health- aides (female health workers) have been trained to diagnose and treat RTI's. Between April 2001 and July 2005, two alternative approaches to detect and treat RTIs in the community were tried. One approach used trained

village health-aides during her regular visits to the village and the other used a lady doctor at the sub centre during her visits once in 6 weeks.

The control of STIs takes on greater importance with the advent of HIV in the community. There has not been a recent prevalence study for RTIs in Kaniyambadi block. It was considered necessary to quantify the burden of RTIs in the community as part of the strategy to control HIV. The effectiveness of the community intervention also needed to be evaluated for further planning. Symptomatic prevalence was monitored by the field workers from 2001 to 2005 during the intervention period. Conclusions cannot be drawn based on this alone as a change in prevalence may be due to a change in reporting patterns and not just a rise or fall of infections in the community. Hence there was a need to measure prevalence using laboratory tests. A similar study was conducted in 1996 in the preintervention period. Comparison of the two studies would indicate the change in prevalence in the post-intervention period. If the intervention was found successful, similar education and health care efforts implemented on a wider scale could dramatically improve the health of young women.

2 . AIMS AND OBJECTIVES

AIM :

To study the effect of a community - based intervention on the prevalence of reproductive tract infections in the community .

OBJECTIVES :

1) To determine the prevalence of reproductive tract infections in the community.
2) To study the influence of multiple factors on the prevalence of reproductive tract infections.
3) To study the symptomatic prevalence of RTIs during the intervention period.
4) To compare the results with a preintervention study done in 1996 – 97.

3 . REVIEW OF LITERATURE

Overview

Reproduction plays a central role in the lives and health of women in many parts of the world. Reproductive health is defined as a state of complete physical, mental and social well being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes.[10] The reproductive health approach was globally adopted at the International conference for population and development in Cairo in 1994 and reaffirmed at the Beijing Women's conference in 1995 . Tenets of this approach include the integration of reproductive health services, provision of client-centered, gender-sensitive, high quality health care, universal access and free and informed reproductive choice guided by a human rights framework.[10] Treatment of reproductive tract infections forms an important component of reproductive health.

Magnitude of the problem:

The global disease burden of RTIs, including STIs is a major public health concern. Nearly one million new cases of curable STIs occur each day. Non - sexually transmitted RTIs are even more common. The main burden of the disease is borne by the developing countries. Although South and South East Asia have the largest numbers of new cases of STIs, sub–Saharan Africa has the highest rate of new cases of STIs per 1,000 population.[4]

Owing to the paucity of community- based prevalence studies, there is little reliable information on the burden of reproductive health problems in developing countries.[15]

The landmark study by Bang and Bang in 1989 in Maharashtra was among the first community based studies on the prevalence of gynaecological morbidity among Indian women.[16] Information from the few community based surveys in India confirm a high prevalence of RTI's. In a study done by the Community Health Department, CMC Vellore in 1996–97, 53 % of women reported gynecological symptoms, 38 % had laboratory findings of RTIs and 14 % had clinically diagnosed pelvic inflammatory disease or cervicitis. Thirteen percent had trichomoniasis, 18 % had bacterial vaginosis and 10 % had vaginal candidiasis.[14] A population based study in Goa between 2001 and 2003 detected bacterial vaginosis in 17.8 %, candida in 8.5 % and sexually transmitted infections in 4.2 %.[2] In an urban slum in Delhi, among 301 women 56% were found to infected with any of the RTIs; 41 % had bacterial vaginosis , 29 % had Chlamydia,,19 % had candida, 4 % had trichomoniasis and 4 % had syphilis.[17]

Classification of Reproductive Tract Infections: [18]

Classification by Etiology :

A) Sexually transmitted infections (STIs) : These are transmitted through sexual activity with an infected partner. The common STIs are trichomoniasis, chlamydia, gonorrhea, syphilis, genital herpes, genital warts and HIV infection.

B) Endogenous infections : They result from an overgrowth of organisms normally present in the vagina. They include bacterial vaginosis and candidiasis.

C) Iatrogenic infections : These occur when the cause of infection is introduced into the reproductive tract through a medical procedure such as insertion of IUD, induced abortion or during childbirth.

Classification by site of infection:

A) Lower reproductive tract infections :

a) Vaginitis : In this the vulva and / or vagina are infected. These can be caused by endogenous infections like bacterial vaginosis, candidiasis or STIs like trichomoniasis.

b) Cervical infection : These are commonly caused by gonorrhea or chlamydia. They are more severe than vaginal infections as they more commonly lead on to upper respiratory tract infections.

B) Upper reproductory tract infections :

a) These involve the uterus, fallopian tubes and ovaries causing pelvic inflammatory disease. They are often a direct complication of lower reproductive tract infections like chlamydia and gonorrhea or iatrogenic procedures like IUCD insertion or induced abortions. They have complications like chronic abdominal pain, ectopic pregnancies, menstrual irregularities and infertility as a result of scarring of the tubes.

Common symptoms of Reproductive tract infections :

-vaginal discharge

-itching over the genital area

-burning pain while passing urine

-lower abdominal pain

-ulcer over genetalia

-painful enlarged lymph node.

Consequences of untreated RTI's in women :

Reproductive tract infections (RTI) present major health, social, and economic problems in developing countries.

Health Problems :

a) Adverse pregnancy outcomes : spontaneous abortions, still births, prematurity, low birth weight, postpartum endometritis. It can also cause neonatal pneumonia, congenital syphilis and blindness.[3] A multicentric cohort study was conducted between 1984 and 1989 in the United States of America to evaluate the association between the incidence of preterm deliveries in low birth weight babies and that of bacterial vaginosis. In this study, women with bacterial vaginosis diagnosed during the second trimester of pregnancy were 40 percent more likely to give birth to a premature, low-birth-weight infant than women without bacterial vaginosis. [18] In another study, women with bacterial vaginosis and an increased risk of preterm delivery had significantly lower rates of delivery before 37 weeks of gestation when they are treated with metronidazole and erythromycin. [19]

b) Complications following fallopian tube scarring : The sequelae of undetected and untreated infections like acute salpingitis and pelvic inflammatory disease can lead on to chronic lower abdominal pain, tubo-ovarian abscess, ectopic pregnancy and infertility. In a study conducted in Aligarh, India, Chlamydia trachomatis was detected in 28.1 % of infertile women which was significantly higher than 3.3% in the control group.[20]

c) Cervical cancer : Human papilloma virus infection has been shown to be a central causal agent for cervical cancer and its contribution to the risk of disease is much greater than that of any other determinant.[21,22]

d) Psychological and emotional problems.

e) Increased rate of transmission of HIV : Observational studies have suggested that the sexual transmission of HIV may be increased in the presence of other sexually transmitted diseases[23]

Social Problems : These include disruption of domestic and economic activities, verbal and physical abuse, fear of childlessness, abandonment and disruption of marital relations.[5]

Economic problems : Direct costs are incurred in diagnosing and treating the disease and preventing it's spread. Indirect costs include the value of labour lost if severe symptoms interfere with economic activities. [5] Women experience more severe consequences than men as they are biologically more susceptible, they are more likely to have asymptomatic infections which are not detected and are more likely to suffer from complications.[4]

Barriers to control of RTIs :

Gender power imbalances and lack of autonomy of women are major obstacles to treatment. Gender norms discourage women from articulating health needs, especially those related to sensitive subjects like gynaecological symptoms.[6] Women consider any morbidity relating to the reproductive system a matter of shame and may not even discuss it with the

family, let alone seek care for it. Their limited control over resources and lack of decision-making makes them economically dependant on their husbands for treatment of symptoms.[4]

A fundamental barrier is the asymptomatic nature of many infections. Lack of screening programmes or rapid inexpensive diagnostic tests results in a large number of women experiencing unrecognized chronic infections. [9] Even if noticed, symptoms are often considered "normal" or something that a woman has to bear with and are ignored. Hence even when women recognize a symptom as abnormal and causing discomfort, they often do not seek treatment readily. [4] Women are often ignorant of how their bodies work and are unable to interpret signs of morbidity. [7]

Other obstacles relate to the availability and accessibility of health care, costs of treatment, quality of care and beliefs about the appropriate provider to consult.[8] They are often reluctant to undergo a clinical examination, especially by a male doctor. The social stigma associated with STIs can result in women seeking care from alternate providers or not seeking care at all. Fear of violation of confidentiality is often a barrier, especially among adolescents. At the policy level, lack of appreciation of the disease burden of RTIs has lead to inadequate financing for its control.[9]

Prevention and Control:

The objectives of prevention are to reduce the prevalence of RTIs by interrupting their transmission, reducing the duration of infection and preventing the development of complications in those infected .

Primary prevention: This seeks to reduce the acquisition of infection. It is achieved through health promotion and focuses on reducing risks. It can be targeted to individuals, groups or to entire communities.

Secondary prevention: It involves detecting and treating infected people. Efforts should be made for early diagnosis and prompt and effective treatment to minimize the development of complications..

Screening for Reproductive Tract Infections:

Since reproductive tract infections in the female are a cause of considerable morbidity and mortality, and seeking treatment is quite late among the affected, it is worthwhile having a screening programme for these infections. One of the methods that has been tried has been the self screening based on the nature of the vaginal discharge. However, a study conducted to compare women's reports with medical diagnosis of reproductive morbidity conditions in rural Egypt shows [41] that, women's reports of vaginal discharge agree moderately well with the physician's observations but are not good predictors of the occurrence of reproductive tract infections. A diagnostic tool would help in assessing the probability of disease. The test can be either positive or negative, and a disease can be either present or absent. Screening can be followed by prompt treatment, thereby reducing the complications.

It is desirable to have a test that is both highly sensitive and specific, but in practice this is not usually possible. Either of these can be increased only at the expense of the other. Sensitivity and specificity of a test are taken into account when a decision is made whether or

not to order the test. However, once the test results are obtained, it is the probability of disease, given a positive test result that is more important. This is called the predictive value of the test, also called the posttest probability.

Syndromic Approach to Management of STIs : [24]

As early as the 1970s, public health physicians, particularly those working in Africa, became interested in testing simple clinical tools for controlling and treating STIs . This resulted in the design and promotion of "syndromic management" guidelines for STIs by the World Health Organization in 1991. It was developed for the treatment of men and women in less developed countries and resource- poor settings where there is a shortage of experienced doctors and laboratory services.

The syndromic approach consists of treating RTI-related symptoms with a combination of antibiotics likely to cover the major causal agents. It was developed by the WHO for the treatment of men and women in less developed countries and resource- poor settings where there is a shortage of experienced doctors and laboratory services. These clinical algorithms recognise that there are several possible causes of common clinical syndromes and recommend treatment based on the most common causative organisms without relying on a medical and laboratory infrastructure. Primary health care workers can be trained to apply these guidelines to manage patients for RTIs. It focuses on four main sets of symptoms which might each be caused by a range of infectious agents. They are vaginal discharge, lower abdominal pain (women), urethral discharge (men) and genital ulcers (men or women). Symptoms have proven quite predictive of STIs for male urethral

discharge, intermediately predictive for genital ulcers, and poorly predictive for vaginal discharge.

The main advantage is that it does not rely on laboratory tests which are costly, time consuming and inaccessible in many developing countries. [11] The patient is treated immediately and need not come for a second visit to follow up the result . However syndromic is not always appropriate and has been much criticized. Protocols based on symptoms cannot identify and treat asymptomatic cases, and a bulk of STIs in women are asymptomatic. Even symptomatic women do not always recognize and report their symptoms to providers. Many women complain of vaginal discharge, yet have no significant infection. The poor specificity of the syndromic approach will lead to substantial over-treatment of women with presumed STDs. Over-treatment wastes resources, exposes women to the risks of side-effects of antibiotics, and contributes to the spread of antibiotic resistance[26,27] hence there is a need to review these algorithms with regard to their applicability.

Public health response to prevention and control: [4]

Services for RTI prevention and care should be expanded and a public health approach should include the following elements:

a) Promotion of risk reduction and safer sexual behaviour.

b) Promotion of early health – care seeking behaviou.

c) A horizontal implementation of STI / RTI prevention and care across all primary health care programmes through an integrated approach.

d) A comprehensive approach to RTI case management that encompasses :

- identification of the RTI

- appropriate antimicrobial treatment
- education and counseling on ways to avoid or reduce risks
- promotion of correct and consistent use of condomns
- partner notification

Strategies for better control of RTIs :

a) Evidence base for interventions : Since policy makers set health sector priorities and allocate funds based on the burden of disease and the availability and feasibility of cost- effective interventions, evidence in these areas is vital. [29] Presently, in the field of RTIs, there is a shortage of studies providing this information; hence there is an urgent need for further research.

b) User - friendly services for adolescents :

In India about 15 % of pregnancies are among teenage girls under age 18. Induced abortions are also common in this age group and 8 -10 % of those who seek medical termination of pregnancies are teenage mothers and unmarried girls. [30] Studies have reported high rates of pre – marital sexual activity among teenage boys. Adolescents have little access to information on reproductive health and much of their information is from their peer group is from the media. The reproductive services that do exist are often unresponsive to the broader needs of adolescents, especially those who are unmarried. Young people are often reluctant to seek help due to embarrassment or confidentiality issues and hence expose themselves to the long term consequences of untreated reproductive tract infections. Health services should be more responsive and acceptable to adolescents. [31,32] Information, health care and support should be acceptable to them. Special hours should be introduced for

adolescent clients and providers should be motivated and trained to provide appropriate counsellling, care and support.

c) Male involvement and services for men : Traditionally reproductive health care services have been female oriented [35] and have focused their efforts on involvement of women to control RTIs. However men have reproductive health needs as well which become neglected since men are too embarrassed to obtain services for RTIs from institutional facilities. Involving men is particularly challenging in countries whose culturally defined gender roles may hinder men's participation.

There is a growing recognition that unless services reach men, efforts to improve women's reproductive health will also have limited impact. [33] If men are brought into a wide range of reproductive health services in such a way that they are supported as equal partners and responsible parents, as well as clients in their own right, better outcomes are expected in reproductive health. [34]

The potential benefits of men's involvement include expanded rights for women, improved family health, better communication between partners and joint and informed decision–making. To ensure effective male participation in couple's reproductive health, it is necessary to provide men with adequate information about reproductive and sexual health in a culturally sensitive manner. Existing educational approaches and programmes should be reviewed and modified, so that both partners can receive services. Programmes to involve men should be designed to address three major goals: [34]

- generate men's support for women's actions related to reproduction and respect for women's reproductive and sexual rights

- improve the sexual health of men
- promote responsible and healthy reproductive and sexual behaviour in young men and boys.

d) Women's empowerment : There is a need to address gender inequalities through interventions that influence social norms and attitudes concerning sexual behaviour and the status of women . Empowerment of women through education is a key factor to improve reproductive health.[35] Choice and dignity will only be possible if prevalent notions harmful to health of the reproductive system are questioned. Provision of services by itself will not overcome the culture of silence surrounding these disorders. Health–care providers need to stimulate the demand for services at the same time as they are meeting that demand.

e) Community involvement : For better acceptability and relevance, the involvement of the community with regard to matters concerning their own health is vital. [9] Communities should be provided necessary information and encouraged to design, implement and evaluate interventions for RTI control. Partnerships with community - based organizations would help in provision of prevention and care services.

f) Targeting vulnerable people for education and service provision : Vulnerable communities include those groups who are underserved due to problems of geographical access and those who suffer social and economic disadvantages. Interventions should be planned to improve accessibility, availability and acceptability of health services for these groups so that they are in par with the rest of the population. The Vulnerable Communities Health Plan for the RCH – 2 programme is an effort in this direction. [37]

g) Comprehensive counseling : Effective counselling must deal with the issues of risk and vulnerability .

Elements of effective counseling:[37]

- try to understand how a person's situation may increase risk and vulnerability
- provide information on risky behaviour, dangers of STIs and how to protect themselves.
- identify barriers to change in risky behaviour, which can be altered
- help people find the motivation to reduce their risk.
- establish goals for risk reduction
- offer real skills and choices
- plan for set backs and how to deal with a difficult situation

Counselling on behavioural change of both infected and uninfected people creates motivation to change sexual behaviour in both the groups . A randomized control trial conducted between 1993 – 96 in Baltimore clearly demonstrated the benefits of counseling. [38] The study demonstrated that interactive, client – centred counseling resulted in an overall reduction in STD incidence of about 30 % after 6 months and 20 % after 12 months of follow – up . The STD reduction occurred among both men and women and was observed consistently at all 5 study sites.

h) Newer technologies:

- Rapid diagnostic tests: Since syndromic management of women with vaginal discharge is not very reliable, especially in areas of low STI prevalence, there is a need to develop affordable, rapid STI diagnostic tests for early case detection and screening.

- Community based screening: Since many RTIs are asymptomatic, screening would help in the diagnosis and management of these patients and prevent long term sequalae.[22]

- Vaccines : Preventive vaccines against oncogenic human papillomavirus is under development. National governments should strive for a high coverage, especially in

adolescents, to protect them before they become sexually active.

i) Drug supply : Ensure a reliable supply of safe, effective , high quality and affordable medicines and condoms.

l) Public – private partnerships: The private practitioners, traditional healers or informal providers like pharmacists are often the first point of contact for patients inspite of the availability of free public – sector services. [9] They are more acceptable because they are perceived to offer better access and confidentiality and are less stigmatizing than public sector facilities. Considering this situation, private and informal sector should be involved in public policy and public – private partnerships should be established. Effective and appropriate regulatory measures should be taken by the governments to ensure technical quality and accountability in the private sector. Training programmes for pharmacists and private practitioners on national guidelines for STI case management should be conducted.

m) Strengthening the capacity of health systems: Health systems need to be reformed so that there is an effective delivery of services which is equitable, client responsive, sustainable, efficient and of good quality. The main constraints found in health systems are lack of accountability for quality care, non-availability of staff, weak referral system and recurrent funding shortfalls.[12] It is necessary to identify which failures in service are attributable to causes, which could be removed or changed and then to take concrete steps towards needed reforms.

n) Revised medical education: Educational institutions need to play a greater role in

comprehensive STI training, which includes all aspects of prevention, care and counseling for physicians, nurses, laboratory workers, pharmacists and public health staff during their basic training. In-service and on-the-job training should be provided to all the members of the health care team.

Hence the strategies for the control of RTIs should be comprehensive and community-oriented, involving a public health approach.

4 . METHODOLOGY AND MATERIALS :

STUDY DESIGN :

The study was a community based cross-sectional study.

STUDY AREA :

This study was conducted in Kaniyambadi Block, a rural area in Vellore District with a population of a little over 1,10,000 in 64 villages. It is a drought prone area. Most villagers are agricultural labourers and some of them are marginal farmers. A significant number of young men are in the army. A few men go to other places for construction work and other jobs.

The Community Health and Development Programme of Christian Medical College, Vellore has been working closely with the community to improve its health and socioeconomic status, especially that of women. Along with the government health services, it provides primary health care for the block by a community health volunteer in every village, a health-aide for every 4,500 – 5000 population, a public health nurse for every 5- 6 health-aides and a medical doctor for every 30,000 population. A mobile clinic offering preventive and curative services visits each village every month. Patients who cannot be treated are referred to the base hospital which offers secondary care services. If tertiary care is needed, patients are further referred to the Christian Medical College and Hospital, where speciality care and advanced laboratory services are available.

CHAD has adopted a comprehensive community based interventional strategy to reduce the burden of RTIs. Health education providing information on RTI's is provided to adolescents, young married couples and in regular mass education campaigns held in the

villages. The health team offers counseling on risk reduction both at the hospital and during home visits. An intervention study was carried out between 2001 and 2005 in diagnosing and treating reproductive tract infections by alternative strategies namely, the trained Health-aide at the village (Arm A) during her regular visits to the village and the lady doctor at the subcentre during her visits once in 6 weeks (Arm B), using the same protocols. There were 5 health-aides in the health-aide arm under one PHC area and 5 health-aides in the doctor arm under another PHC area. The doctor arm had 5 subcentres under that PHC, hence every subcentre was visited by the female doctor once in 6 weeks.

TARGET POPULATION : Ever married women between the age group of 15-45 years.

SAMPLING FRAME : Women enlisted in the updated 2005 census conducted by the Community Health department , CHAD.

STUDY POPULATION :

The study group included married women in the age group of 15 - 25 years in Kaniyambadi block.Women who were pregnant or who had given birth in the previous 6 weeks were excluded due to greater susceptibility to vaginal candidiasis during this time. Others excluded were those who had temporarily or permanently moved out, who lived elsewhere as their husbands were in the army and those who lived in remote field huts as it was difficult to access them. The women who had menstrual periods on the day of examination were also excluded as they were unable to be examined.

SAMPLE SIZE :

Desirable sample size was calculated using the formula

$N = 2 \times P \times Q \times 7.84 / (P^1 - P^2)$

P^1 which was the prevalence of Trichomoniasis detected in the preintervention study was 13%. Assuming a 50% reduction in prevalence , P^2 which is the prevalence after the intervention was assumed to be 6.5%.

Using this formula the sample size was calculated as 250 .

Sample size was calculated using the prevalence of trichomonas as it was the commonest sexually transmitted infection and it was possible to have an objective estimation based on reliable laboratory tests.

SAMPLE SELECTION :

The sample was selected in two stages. In the first stage the study population was stratified based on health-aides. There were 5 health-aides in each arm. In the second stage the eligible women were arranged according to their ID numbers and using systematic random sampling 50 – 60 women were identified from each health-aides area. This list was given to the health- aides to invite the women to participate.

CONSENT :

Permission was sought from the village elders to conduct the study. The health- aide of the respective villages visited the women, explained the details of the examination, obtained their consent and invited them to participate.

DATA COLLECTION :

Permission was sought to use the health centres for the purpose of examination on a convenient date. Transportation was arranged for those women who resided far from the sub-centre. The investigator (female physician) and a laboratory technician visited the area on the scheduled days and conducted the study.

Data collection consisted of the following :

a) Questionnaire administered by the female physician. Information was obtained on their menstrual history, perceived gynaecological symptoms, perceived causes of these symptoms, health seeking behaviour, obstetric history and contraceptive practices.

b) Physical Examination : This consisted of a speculum examination followed by a pelvic examination to detect clinical signs of reproductive tract infections.

c) Laboratory testing : The physician collected swabs from the vagina and endocervix. Blood was drawn to test for syphilis.

Tests were done to detect the following infections :

c.1) Trichomonas vaginalis :

- Wet mount preparation using saline
- Culture using Diamond's medium

c.2) Bacterial vaginosis :

- Gram staining of smear

c.3) Candida albicans :

- Wet mount preparation using KOH
- Culture using Sabouraud's medium

c.4) Syphilis :

- Rapid Plasma Reagin test : Serological test to detect antibodies

c.5) Chlamydia trachomatis :

- Polymerase chain reaction test.

c.6) Neisseria gonococcus :

- Polymerase chain reaction test.

Since the prevalence of Chlamydia and gonococcus in the preintervention study was low, the calculated sample size was inadequate to detect a significant change. Hence it was decided to test just a sub-group of the population.

Wet mount preparation and examination was done by the laboratory technician at the examination site. Specimens for culture, gram staining and polymerase chain reaction test were transported to the microbiology laboratory of the Christian Medical College on the same day at suitable temperature.

DIAGNOSTIC CRITERIA USED :

a) Trichomonas vaginalis

Criteria used : Positive culture of viable trichomonas vaginalis or positive wet mount preparation test.

b) Syphilis

Criteria used : Positive serology for rapid plasma reagin test.

c) Bacterial vaginosis

Criteria used : Nugents scoring of 4 or above in patients with symptoms of vaginal discharge.

d) Candidiasis:

Criteria used : Positive culture for candida with the presence of curdy white discharge.

e) Chlamydia

Criteria used : Positive Polymerase chain reaction test for Chlamydia.

f) Gonorrhoea

Criteria used : Positive Polymerase chain reaction test for gonococcus.

g) Cervicitis

Criteria used : cervical erosion with purulent discharge from the cervix.

h) Pelvic inflammatory disease : Adnexal tenderness and / or the presence of tender adnexal mass on bimanual pelvic examination .

STATISTICAL ANALYSIS :

Analysis of the data was performed using SPSS version 11.5. The data was available on 434 women and their partners. The prevalence of RTIs and STIs in the sample population was calculated. The outcome variables were RTIs and STIs. Among the predictor variables

age, age at marriage and socioeconomic status were continuous variables . Categorical variables were respondent's occupation, respondent's education, abortions, tubectomies, number of pregnancies, use of sanitary napkins, occupation of husband and use of intrauterine copper device. Univariant analysis of the predictor variables was done. The variables whose univariant test had a p value less than 0.2 were chosen to construct a multivariant model to determine variables that were significant to the outcome. Test of proportion was done to analyze the drop in prevalence of RTIs as compared to the preintervention study.

RESULTS :

The total number of married women between the ages 15 - 25 years in Kaniyambadi block in Arm A and Arm B was 1740. The following were excluded : those who were currently antenatals or postnatals, those who had temporarily or permanently moved out, who lived elsewhere as their husbands were in the army and those who lived in remote field huts as it was difficult to access them.The number after exclusion was 1364 (78%).There were 5 health-aides in each arm.The eligible women were arranged according to their ID numbers and 50 – 60 women were selected from each health-aides area by stratified random sampling. This list was given to the health- aides to invite the women to participate. 7 % were temporarily away from the village during the camp period and 48 of the remaining 494 refused to participate. Among the ones who responded 30 had menstrual periods during the camp period. They were unable to be examined and so were excluded. Hence the number who participated was 434 (94 % of those who were eligible). Of this number, 229 (94%) were from arm A and 205 (93%) were from arm B.

	Arm A	**Arm B**	**Total**
Total population	**962**	**778**	**1740**
Currently antenatal	18(2%)	22(3%)	40(2%)
Currently postnatal	66(7%)	54(7%)	120(7%)
Husband in army	30(3%)	40(5%)	70(4%)
Permanently moved out	8 (1%)	10 (1%)	18 (1%)
Remote Field huts	15 (2%)	15 (2%)	30 (2%)
Temporarily moved out	58 (6%)	42 (5%)	100 (6%)
Population after exclusion	769 (80%)	595 (77%)	1364 (78%)
Called to participate	278	254	532
Temporarily absent	16 (6%)	22 (9%)	38 (7%)
Eligible	262	232	494
Responded	248 (95%)	216 (93.%)	464 (94 %)
Menstruation during camp period	19 (7%)	11 (5%)	30 (6%)
Participated	229/243 (94%)	205/221 (93 %)	434/464 (94 %)
Refused	14 (5%)	16 (7%)	30 (6 %)

DEMOGRAPHIC FEATURES:

The mean age for women in Arm A was 21.79 years (SD 1.9) and Arm B was 21.56 years (SD 1.9). The mean education was standard 7.8 (SD 3.1) for Arm A and 8.7 (SD 2.5) for Arm B. Other demographic and reproductive characteristics are given below. There was a larger percentage of farmers in Arm A. Women in Arm A also had more multiple pregnancies and tubal ligations.

	Arm A (n = 229)	Arm B (n = 205)	p value	Total (n = 434)
	number (%)	number (%)		Number (%)
Occupation			0.166	
Housewife only	154 (67 %)	153 (74 %)		307 (71 %)
farmer	48 (21 %)	26 (13 %)		74 (17 %)
non agricultural labourer	20 (9 %)	22 (11 %)		42 (9.5 %)
salaried / small business	3 (1 %)	1 (.5%)		4 (1 %)
others	4 (2 %)	3 (1.5%)		7 (1.5 %)
Number of pregnancies			0.026*	
0	25 (11 %)	26 (13 %)		51 (12 %)
1	72 (31 %)	90 (44 %)		162 (37%)
2	93 (41 %)	69 (34 %)		162 (37%)
3 - 4	39 (17 %)	20 (9 %)		59 (14%)
Current contraceptive methods			0.002*	
None	122 (54 %)	133 (66 %)		255 (59 %)
tubal ligation	89 (39 %)	43 (21%)		132 (31 %)
IUCD	11 (5 %)	14 (7 %)		25 (6 %)
Oral pills	1 (0.4%)	3 (2 %)		4 (1 %)
Condom	5 (2 %)	8 (4 %)		13 (3 %)
Type of sanitary used			0.187	
Cloth				
Disposed	7 (3 %)	5 (2.5 %)	0.768	12 (3 %)
Reused	195 (85 %)	166 (81.5%)		361 (83 %)
Disposable napkin	27 (12 %)	33 (16 %)		60 (14 %)

* p value is statistically significant

There were 74 abortions of which 61 were spontaneous and 13 were induced. Among the induced abortions 7 had dilatation and curettage, 2 had injections and 3 had tablets for induction. There were 101 (23 %) women with primary infertility.

Demographic features for husbands are given below. Arm B had a larger proportion of men in the armed forces.

	Arm A	Arm B	p value	Total
Mean Age (SD)	30.9 (SD 4.4)	29.98 (SD 3.9)	0.211	30.5 (SD 4.2)
Mean Education	8.75 (SD 3.2)	9.1 (SD 2.9)	0.117	8.9 (SD 3.1)
Occupation			0.400	
farmer	66 (29 %)	65 (32 %)		131 (30 %)
labourer	51 (22 %)	37 (18 %)		88 (20 %)
armed forces	14 (6 %)	24 (12 %)		38 (9 %)
salaried / small business	19 (8 %)	15 (7 %)		34 (8 %)
transport workers	26 (11 %)	20 (10 %)		46 (11 %)
others	52 (23 %)	42 (21 %)		94 (22 %)

GYNAECOLOGICAL SYMPTOMS :

The gynaecological symptoms reported by the participants are given below. There was more vaginal discharge reported in Arm A and this difference is statistically significant.

	Arm A	Arm B	p value	Total
Symptom	number (%)	number (%)		number (%)
vaginal discharge	75 (33 %)	48 (23 %)	0.031*	123 (28 %)
genital itch	10 (4 %)	16 (8 %)	0.132	26 (6 %)
dysuria	8 (3.5 %)	8 (3.9 %)	0.821	16 (4 %)
abdominal pain	19 (8 %)	11 (5 %)	0.229	30 (7 %)
any symptom	81 (35 %)	60 (29 %)	0.175	141 (32 %)

* p value is statistically significant

Partner's symptoms:

These were reported by their wives. Many of them did not know if their partners had any symptoms. There were very few symptoms reported in comparison to the number of women who had symptoms.

	Arm A	Arm B	p value	Total
	number (%)	number (%)		number (%)
Does not know	17 (7.4 %)	13 (6.5 %)	0.719	30 (7 %)
No symptoms	207 (90.4 %)	179 (89.9 %)	0.878	386 (90.2 %)
Symptoms				
Urethral discharge	1 (0.4 %)	2 (1 %)	0.482	3 (0.7 %)
Penile ulcer	1 (0.4 %)	2 (1 %)	0.482	3 (0.7 %)
Dysuria	3 (1.3 %)	2 (1 %)	0.770	5 (1.2 %)
Inguinal swelling	0	1 (0.5 %)	0.283	1 (0.2 %)
Scrotal swelling	0	1 (0.5 %)	0.283	1 (0.2 %)

CLINICAL DIAGNOSIS OF RTI :

Based on the clinical examination findings, the following diagnosis was made by the doctor. The difference was not statistically significant. The most frequent diagnosis made was trichomoniasis. There were very few women with a clinical diagnosis of pelvic inflammatory disease.

	Arm A	Arm B	p value	total
Endogenous infection				
Bacterial vaginosis	18 (8 %)	20 (10 %)	0.522	38 (9 %)
candidiasis	16 (7 %)	10 (5 %)	0.332	26 (6 %)
Sexually transmitted infections				
trichomoniasis	27 (12 %)	23 (11 %)	0.801	50 (12 %)
cervicitis	12 (5 %)	6 (3 %)	0.213	18 (4 %)
Pelvic inflammatory disease	5 (2 %)	1 (0.5 %)	0.126	6 (1 %)
Any RTI	68 (30 %)	56 (27 %)	0.507	24(28 %)

FINAL DIAGNOSIS OF RTI :

The final diagnosis was made based on a combination of laboratory and clinical findings. There were 19 culture samples positive for trichomoniasis and wet preparation picked up 2 more. Gram staining for bacterial vaginosis showed 69 samples with intermediate score and 104 samples with a high score. Women with a history of vaginal discharge in addition to an intermediate or heavy score on the gram stain were diagnosed to have bacterial vaginosis. Candida wet preparation showed 63 samples with yeast forms and 2 samples with mycelial forms. Candida culture yielded a heavy growth of organisms in 101 and moderate growth in 35. Clinical appearance of curdy white discharge and a positive culture was diagnosed as candidiasis.

Endogenous infections	Total
Bacterial vaginosis	54 (13 %)
candidiasis	7 (2 %)
total	61 (14 %)
Sexually transmitted infections	
Trichomoniasis	21 (5 %)
chlamydia	2 (2 %)
gonococcus	0
syphilis	2 (0.5 %)
Any RTI	78 (18%)

Final diagnosis of RTIs in both arms :

Arm B had less infections than Arm A and this difference was statistically significant for total STIs and RTIs. None of the samples grew gonococcus ; chlamydia was present in

just 1 person in each arm. Bacterial vaginosis was the commonest RTI . Among STIs the most common infection was trichomoniasis.

	Arm A	Arm B	p value	total
Endogenous infections				
Bacterial vaginosis	35 (16%)	19 (9 %)	0.054	54 (13 %)
candidiasis	4 (2 %)	3 (2 %)	0.815	7 (2 %)
total	39 (17 %)	22 (11%)	0.055	61 (14 %)
STIs				
Trichomoniasis	15 (7 %)	6 (3 %)	0.079	21 (5 %)
Chlamydia**	1	1	0.887	2 (2 %)
Gonococcus***	0	0		0
syphilis	2 (0.9 %)	0	0.180	2 (0.5 %)
total	18 (8 %)	7 (3.4%)	0.047*	25 (5.7 %)
Any RTI	51 (22 %)	27 (13 %)	0.014*	78 (18%)

* p value is statistically significant
** done on 91 samples
*** done on 90 samples

The presence of symptoms reported was analysed against the final diagnosis of RTIs. Based on this, the sensitivity and specificity using symptoms as a predictor for RTIs was calculated.

	Symptomatic patients	Asymptomatic patients
	n = 141	n = 293
RTI present	59 (42 %)	19 (7 %)
STI present	11 (7.8 %)	14 (4.8 %)
Endogenous infection present	56 (39.7 %)	5 (1.7 %)
Trichomoniasis present	10 (7.1 %)	11 (3.8 %)
Bacterial vaginosis present	54 (38.3 %)	0
Candidiasis present	2 (1.4 %)	5 (1.7 %)

Using symptoms as a predictor for RTI , sensitivity was 75.6 %, specificity was 76.8 % and positive predictive value was 42 %.

Comparing the clinical diagnosis with the final diagnosis of that infection; it was found that for Trichomoniasis , the sensitivity was 55% and specificity was 90.4%; for bacterial vaginosis sensitivity was 11.5% and specificity was 91.4% and for candidiasis sensitivity was 85.7% and specificity was 95.2%.

FACTORS INFLUENCING RTIs AND STIs :

Univariant analysis was done using variables which were potentially able to influence RTIs or STIs. Those variables with a p value less than 0.2 were used to construct a logistic regression model and variables that remained significant were determined.

UNIVARIANT ANALYSIS :

Discrete variables chosen were housewives without another occupation, the arm of intervention, presence of abortions, tubectomies done, number of pregnancies, use of sanitary napkins, husbands working in the armed forces or involved in transport or agricultural work, use of intrauterine device and respondents education . Continuous variables chosen were socio-economic status, respondent's age, husband's age and education and respondent's age at marriage.

RTIs :

Variables with a p value of less than 0.2 were housewife, arm of intervention, tubectomy, sanitary napkins, agricultural work by husband, respondent's education, socioeconomic status and husband's education.

Variable	RTI (n)	No %	P - value	OR	95% min	95% max
Housewife Only	no = 126	29 (23%)	0.085*	0.683	0.381	1.068
	yes = 306	49 (16%)				
arm	A = 228	51 (22%)	0.014*	0.529	0.318	0.882
	B = 204	27 (13%)				
abortions	no = 358	65 (18%)	0.904	0.961	0.498	1.852
	yes = 74	13 (18%)				
tubectomy	no = 301	60 (20%)	0.124*	0.64	0.361	1.134
	yes = 131	18 (14%)				
no. of pregnancies	<2 = 51	8 (16%)	0.639	1.21	0.545	2.687
	>2 = 381	70 (18%)				
sanitary napkins	clt = 371	72 (19%)	0.079*	0.461	0.191	1.114
	disp = 60	6 (10%)				
army	no = 391	5 (13%)	0.4	0.66	0.249	1.748
	yes = 38	72 (9 %)				
transport	no = 385	72 (19%)	0.409	0.686	0.28	1.685
	yes = 44	6 (14%)				
agricultural work	no = 312	52 (17%)	0.171*	1.444	0.852	2.45
	yes = 116	26 (22%)				
IUCD	no = 408	73 (18%)	0.716	1.208	0.437	3.329
	yes = 24	5 (21%)				
Respondents education	< 8 = 226	51 (23 %)	0.012*	1.910	1.146	3.185
	> 8 = 204	27(13 %)				

Variable	RTI	N	mean	Std dev	SE	p value	OR	95%CI min	95%CI min
Sum Ses	no	353	10.46	3.372	0.179	0.095*	0.939	0.871	1.011
	yes	78	9.77	3.010					
Age	no	353	21.71	1.892	0.101	0.403	0.947	0.834	1.076
	yes	78	21.51	1.912					
Husb Age	no	348	30.44	4.184	0.224	0.697	1.012	0.955	1.072
	yes	77	30.65	4.406					
Husb Educatn	no	351	9.04	3.002	0.16	0.083*	0.935	0.866	1.009
	yes	78	8.36	3.531					
Age at Marriage	no	353	18.67	2.036	0.108	0.763	1.019	0.901	1.153
	yes	76	18.75	1.775					

* p value is less than 0.2

STIs :

Variables with p value less than 0.2 were arm of intervention, use of sanitary napkins, husband working in the armed forces and respondents education.

Variable	**RTI (n)**	**No %**	**P - value**	**OR**	**95% min**	**95% max**
Housewife	no = 126	9 (7 %)	0.439	0.717	0.308	1.669
	yes = 306	16 (5%)				
Arm	A = 228	18 (8%)	0.047*	0.415	0.169	1.014
	B = 204	7 (3%)				
abortions	no = 358	23 (6%)	0.212	0.405	0.093	1.755
	yes = 74	2 (3%)				
tubectomy	no = 301	18 (6%)	0.795	0.888	0.362	2.179
	yes = 131	7 (5%)				
no. of pregnancies	<2 = 51	4 (9%)	0.503	0.685	0.226	2.083
	>2 = 381	21 (6%)				
sanitary napkins	clt = 371	24 (7%)	0.140*	0.245	0.033	1.846
	disp = 60	1 (2%)				
army	no = 391	25 (6%)	0.108*	-	-	-
	yes = 38	0				
transport	no = 385	24 (6%)	0.288	0.350	0.046	2.651
	yes = 44	1 (2%)				
agricultural work	no = 312	17 (5 %)	0.570	1.285	0.539	3.064
	yes = 116	8 (7 %				
IUCD	no = 408	25 (6 %)	0.212	-	-	-
	yes = 24	0				
Respondents education	<8 = 226	8 (4%)	0.111*	1.993	0.841	4.722
	>8 = 204	17 (7.5%)				

Variable	RTI	N	mean	Std dev	SE	p value	OR	95%CI min	95%CI max
Sum Ses	no	406	10.37	3.347	0.062	0.403	0.949	0.841	1.072
	yes	25	9.80	2.784					
Age	no	406	21.70	1.906	0.104	0.284	0.895	0.730	1.097
	yes	25	21.28	1.696					
Husb Age	no	400	30.41	4.176	0.046	0.205	1.060	0.969	1.161
	yes	25	31.52	4.857					
Husb Educatn	no	404	8.91	3.098	0.067	0.939	0.852	0.882	1.145
	yes	25	8.96	3.397					
Age at Marriage	no	405	18.71	2.008	0.111	0.368	0.905	0.752	0.965
	yes	24	18.33	1.659					

* p value is less than 0.2

LOGISTIC REGRESSION :

The variables found to be statistically significant for RTIs in the logistic regression model using backward conditional command were tubectomy, respondent's education and arm of intervention. There were no variables that were significant for STIs.

RTI

	B	SE	p value	OR	95% CI min	95% CI max
Tubectomy	- 0.733	0.307	0.017	0.481	0.263	0.878
Respondents Education	0.672	0.272	0.013	1.959	1.150	3.335
Arm	- 0.657	0.271	0.015	0.518	0.305	0.881

STI : no variables were found to be significant

HEALTH SEEKING BEHAVIOUR :

Of the women who had symptoms 70 (51%) sought treatment and 67 (49%) did not take treatment. Places or people approached for treatment were: Chad health aide 19 (4%), Chad peripheral clinic 3 (0.3%), Chad rti camp 8 (2%), Chad hospital 12 (3%), CMC hospital 3 (0.7 %), government camp 1 (0.2%) , government vhn 3 (0.7 %), government phc 5 (1.2%), government hospital 7 (1.6%), qualified practitioner 12 (3%), unqualified practitioner 1 (0.2%) and traditional practitioner 1 (0.2%). Reasons given for not taking treatment were : treatment not necessary 8 (1.8%), very minor 20 (5%), recent onset 10 (2.3%), lack of money 3 (0.7%), lack of time 11 (2.5%), shyness 11 (2.5%) and lack of confidentiality 8 (1.8%).

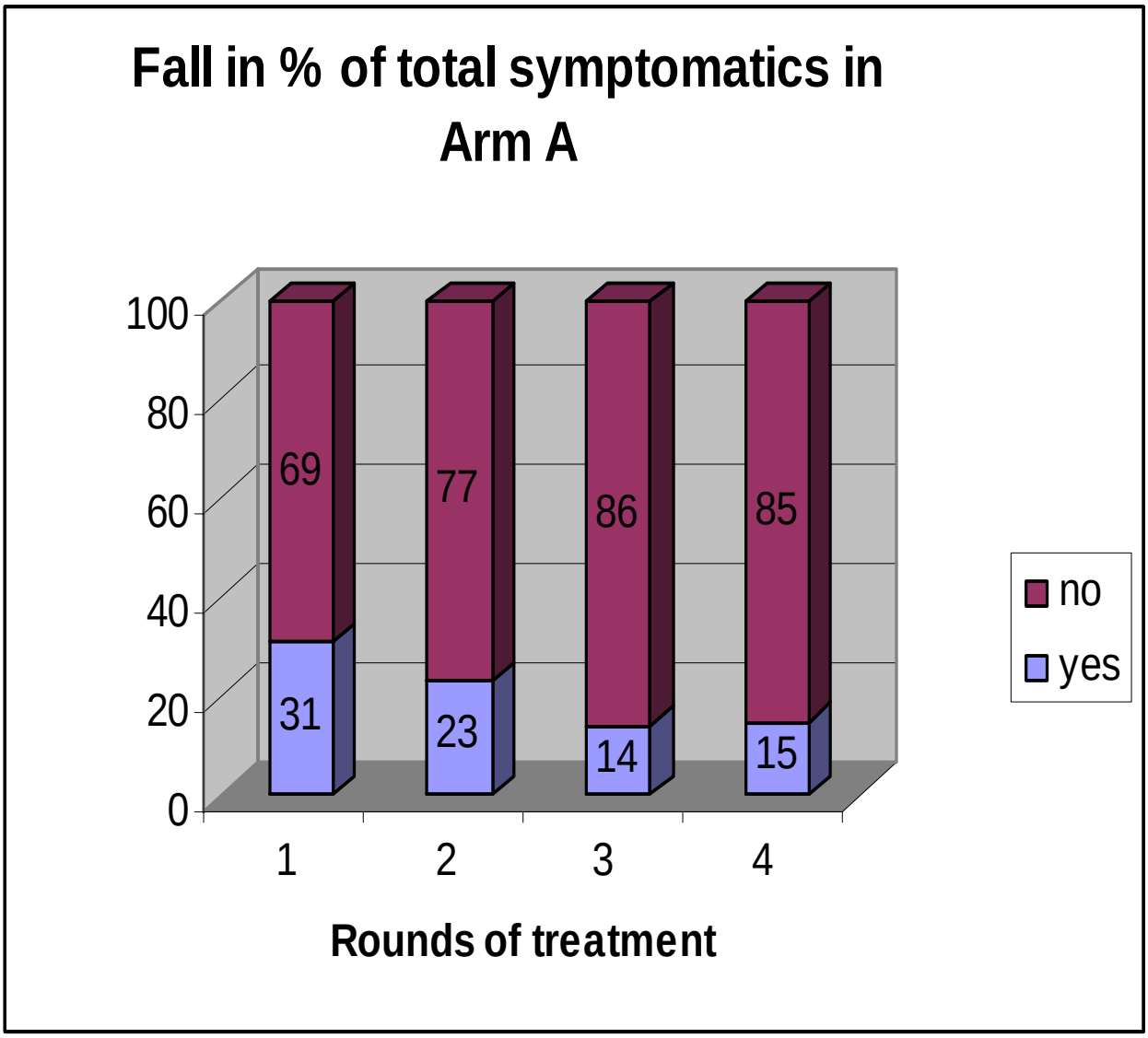
MONITORING OF SYMPTOMATIC PREVALENCE :

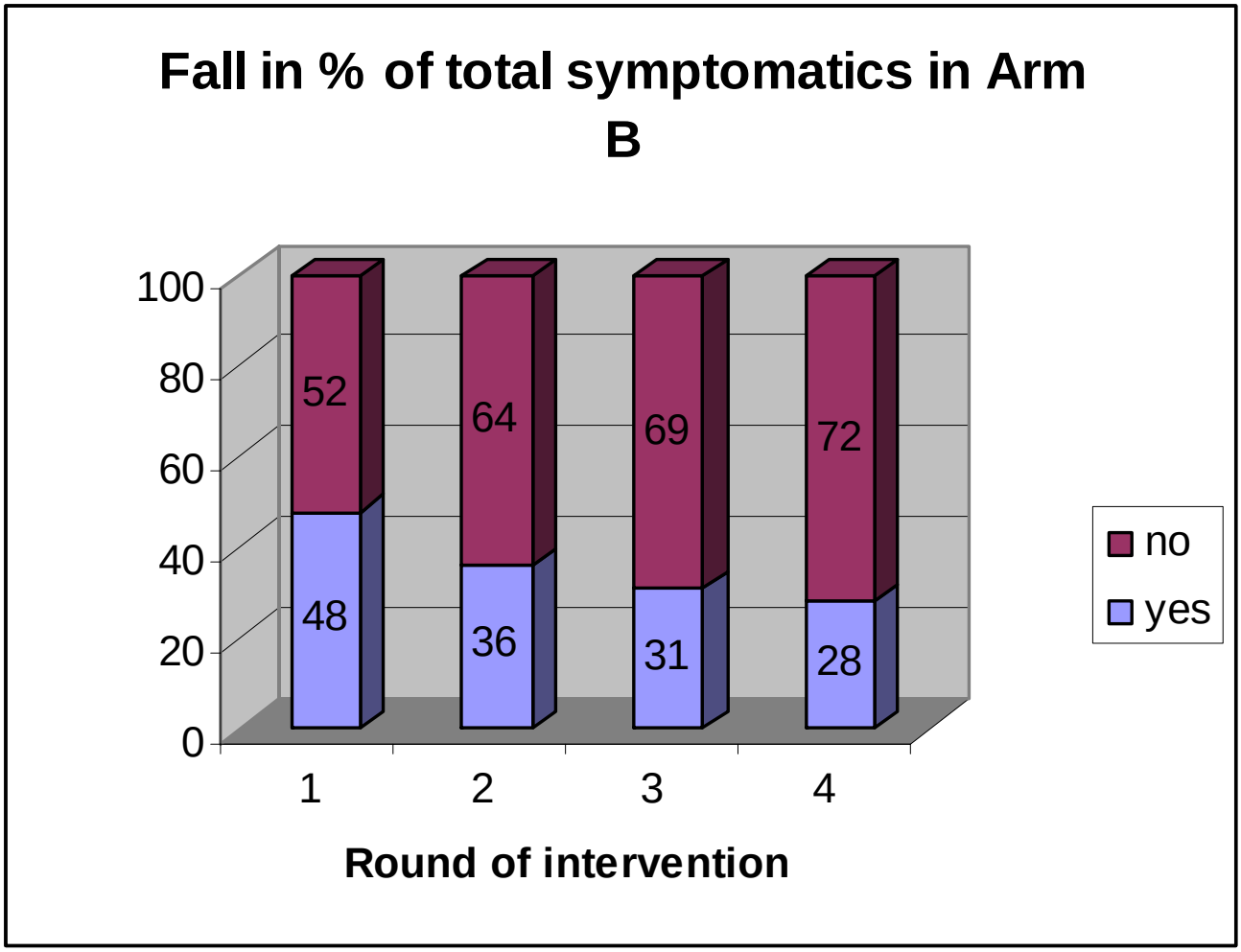
Symptoms were monitored by the field workers over the intervention period from 2002 to 2005.Women who were symptomatic were examined and a clinical diagnosis was made. There has been a declining trend in the number of symptomatics in both arms. However symptom of abdominal pain has increased in arm B. Reproductive tract infections diagnosed clinically have also dropped except for bacterial vaginosis in Arm B.

Variable	2002 (1st)		2nd		3rd		4th	
	A	B	A	B	A	B	A	B
	N	N	N	N	N	N	N	N
Total Target	2292	2294	2292	2294	2292	2294	2292	2294
No interviewed	2155 (94%)	2072 (90%)	1809 (79%)	1942 (85%)	1844 (80%)	2032 (89%)	2030 (89%)	2032 (89%)
Total symptomatic	672 (31%)	998 (48%)	409 (23%)	690 (36%)	258 (14%)	634 (31%)	305 (15%)	566 (28%)
Examined among symptomatic	502 (75%)	545 (55%)	261 (64%)	300 (43%)	135 (52%)	195 (31%)	189 (62%)	258 (46%)
Treated among symptomatic	404 (80%)	300 (55%)	221 (85%)	210 (70%)	114 (84%)	101 (52%)	162 (86%)	129 (50%)

Symptoms	no. (%)	no.(%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)
Vaginal discharge	637 (30%)	861 (42%)	386 (21%)	673 (35%)	246 (13%)	624 (31%)	288 (14%)	545 (27%)
Genital itch	93 (4%)	96 (5%)	62 (3%)	134 (7%)	32 (1.7%)	74 (4%)	60 (3%)	106 (5%)
Dysuria	31 (1.4%)	60 (3%)	16 (0.9%)	66 (3%)	6 (0.3%)	38 (2%)	6 (0.3%)	50 (2.5%)
Abdominal pain	105 (5%)	41 (2%)	55 (3%)	105 (5%)	33 (2%)	103 (5%)	54 (2.7%)	146 (7%)

Clinical diagnosis	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)	no. (%)
Trichomoniasis	287 (43%)	280 (28%)	152 (37%)	145 (21%)	80 (31%)	66 (10%)	115 (38%)	71 (13%)
Candidiasis	38 (5.6%)	17 (1.7%)	24 (5.8%)	12 (1.7%)	17 (6.5%)	11 (1.7%)	30 (9.8%)	15 (2.6%)
Bacterial vaginosis	73 (10.8%)	65 (6.5%)	31 (7.5%)	59 (8.5%)	19 (7.3%)	42 (6.6%)	33 (10.8%)	65 (11.4%)
Cervicitis	70 (10.4%)	55 (5.5%)	34 (8.3%)	38 (5.5%)	17 (6.5%)	9 (1.4%)	21 (6.8%)	14 (2.4%)
PID	9 (1.3%)	9 (0.9%)	0	0	0	0	0	0


Fall in % of total symptomatics in Arm A
100
80
60
40
20
0
69
77
86
85
31
23
14
15
1
2
3
4
Rounds of treatment
no
yes



There was a fall in symptomatic prevalence in Arm A and B in the four rounds of intervention.

DISCUSSION :

This study was done to determine the current prevalence of reproductive tract infections in Kaniyambadi block and then to evaluate the effectiveness of the community intervention. This was done by tracking gynaecological symptoms in the population during the period of intervention. A special group was randomly selected from this population and prevalence based on laboratory tests was determined. Comparing this to a similar study done in 1996 in the pre-intervention period would indicate the effect of the intervention.

Community based studies of this nature have often encountered the problem of women's negative response to a gynaecological examination. [39] As the Community Health Department of CMC has a fairly good rapport with the people in the community, there was a good response rate of 94%, enabling this study to be carried out. Young married women were the target population in this study because in a social context that emphasizes early childbearing, they are likely to experience pregnancy and birth outcomes that might be influenced by RTIs. Worldwide, the majority of new HIV infections occur among young people aged 15-24, hence there is a need to assess the prevalence of RTIs in this age group.

DEMOGRAPHIC FEATURES

The level of education was good and most young women entered high school (72.5%). Health messages focussing on adolescents in high schools is a good strategy for prevention of RTIs. However the remaining girls who never attend high school should be specially targeted so that they are not neglected. Arm B had many more men in the armed forces (12%) than Arm A. Long periods of separation between couples encourages high risk behaviour.[40] Special efforts should be taken to educate this vulnerable group. The number of reported induced abortions was low. It is possible that this is not a true picture as women may not be willing to volunteer this information. Use of sanitary napkins was low and most women reused the cloth during menstrual cycles which placed them at a risk for reproductive tract infections. IUCDs which are reported to increase the risk for RTIs had a poor uptake in this population.[42]

GYNAECOLOGICAL SYMPTOMS :

The present study showed that 32% of the sample population had one or more gynaecological morbidity. There was a fall in symptomatic prevalence as compared to the study done in 1996 in the same area (58%). The most common symptom was vaginal discharge(28%). The monitoring data showed a slow decline in symptoms reported in both arms.

Compared to the large number of women with gynaecological symptoms, very few women (3%) reported the presence of symptoms in their partners. This suggests poor

communication among the couples in this area. Better discussion between them would promote improved health seeking.

TYPES AND PREVALENCE OF RTIS

The present study reveals a prevalence of 18% RTIs in this rural population. The prevalence is lower than the other studies conducted in developing countries. It is possible that this is an outcome of the community intervention.

Comparison of prevalence of RTIs in different population based studies :* [39, 17, 43, 15, 2]

STUDY	Any RTI	Trichomoniasis	candidiasis	Bacterial vaginosis	chlamydia	gonorrhea	syphilis
Haryana 1997	NA	9 %	na	48%	NA	0	NA
New Delhi 1996 – 2000	56%	4%	19%	41%	29%	0	4%
Peru 1997 – 98	70%	11.5%	4.5%	43.7%	6.8%	1.2%	2.9%
Gambia 1999	47%	6.2%	12.6%	37%	1.2%	0	3.2%
Goa 2001-2003	28%	1.2%	8.5%	17.8%	1.3%	1.9%	NA
Present study 2006	18%	5%	2%	13%	2%	0	0.5%

- most current information is not available

The most common RTI was bacterial vaginosis. The clinical signs may not be convincing and many women who seek medical care for this condition are reassured that nothing is wrong. Bacterial vaginosis can lead to an increased incidence of pre-term delivery,[18] chorioamnitis and post partum endometritis. Although culture grew candida in 136 women , invasive infection was present in just 7(2%). This is probably due to improved hygiene. The low prevalence of gonorrhea is comparable with other studies. Overuse of penicillins probably contributes to the low levels of syphilis and gonorrhea.

Of the women who reported the presence of symptoms , 82 (58%) did not have any RTIs. Other studies have reported similar findings among women in South India. It is postulated that genital secretions have deep ethnomedical significance.[6] It may be an expression of powerlessness , anxiety and disturbed family dynamics. Hence it is important that health-care workers are sensitive to these issues and do not dismiss these women as having no medical illness. The syndromic approach to the management of reproductive tract illnesses bases treatment on the presence of symptoms reported. Since more than half of the women who complained of symptoms had no significant infection, this approach would lead to substantial over-treatment of women with presumed RTIs. Overtreatment wastes resources and contributes to the spread of antibiotic resistance.[26,27] Hence there is a need to revise this approach to management.

Among the 291 patients who did not report symptoms , 19 (7%) had RTIs. In the previous study in 1996 , 30% of asymptomatic women had RTIs. Hence there is a better

awareness and willingness to report symptoms which will lead to better control. Of the 25 patients who had STIs , more than half (56%) did not report symptoms. STIs lead to serious chronic consequences , hence there is a need to develop screening tools that detect these organisms.

FACTORS INFLUENCING RTIs AND STIs

Higher educational status of respondents, arm B of intervention (female doctor) and tubectomy were found to be protective for RTIs. A study conducted in Goa in 2001 also reported the protective effect of repondent's education on RTIs. Women with better education are more aware and empowered to seek care for their illnesses. Women in Arm B had better outcome than those in Arm A. The more qualified physician is probably able to diagnose and treat more effectively.

There were no factors found to influence STIs. Some of the factors that could influence STIs like sexual practices could not be studied here due to cultural reasons. Women married to husbands working in the armed forces or in transport did not have significantly higher STIs.

HEALTH SEEKING BEHAVIOUR

Of the women who had symptoms, 70 (51%) sought treatment and 67(49%) did not. There was not much improvement since the earlier study in 1996 when 65% did not seek

treatment. 41% of them did not sense the need to as they perceived their symptoms as minor and not requiring treatment. 16% did not have time which is probably due to household responsibilities which cannot be set aside so as to seek care. Hence services should be provided to them at the community level for better accessability. Women are often reluctant to discuss their gynaecological symptoms and 16% of them did not seek care as they were shy. There is a need to develop more openness and better communication between couples regarding matters relating to reproductive health. 12% of women did not seek treatment for fear of confidentiality. The CHAD health aide was the most sought after person (27%) for health care. Since she has a good rapport with the women and is available at the community level , training the female community health workers to detect and treat RTIs at the community level would be acceptable to the women. Only 1 person approached an unqualified private practitioner in contrast to 61% in the previous study in 1996. This suggests that the health services offered are more acceptable to them.

EVALUATING THE EFFECT OF INTERVENTION

A) Monitoring symptomatic prevalence :

Symptoms were monitored by the field workers during the period of intervention from 2001 to 2005. There is a declining trend in the number of symptoms reported in both arms. In Arm A the total symptomatics dropped from 31% to 15% and in Arm B from 48% to 28%. This fall was most marked with the symptom of vaginal discharge which dropped from 30% to 14% in Arm A and 42% to 27% in Arm B. Clinically diagnosed infections dropped for trichomoniasis from 43% to 38% in Arm A and 28% to 13% in Arm B, cervicitis

and pelvic inflammatory disease. Hence the focused intervention over a period of four years resulted in a declining prevalence of symptoms as perceived by the women.

B) Comparison with the preintervention study in 1996:

The following are the results of the two studies conducted in 1996 and 2006 :

	Pre intervention 1996			Post intervention 2006		
	A	B	Total	A	B	Total
N	210	241	451	228	204	432
STI	40 (19%)	26 (11%)	66 (15%)	18 (8%)	7 (3%)	25 (6%)
Endogenous	71 (34%)	53 (27%)	124 (28%)	39 (17%)	22 (11%)	61 (14%)
Any RTI	97 (46%)	76 (32%)	173 (38%)	51 (22%)	27 (13%)	78 (18%)
TV	36 (17%)	22 (9%)	58 (13%)	15 (7%)	6 (3%)	21 (5%)
BV	48 (23%)	34 (14%)	82 (18%)	35 (16%)	19 (9%)	54 (13%)
Candid	23 (11%)	22 (9%)	45 (10%)	4 (2%)	3 (2%)	7 (2%)
Syphilis	1 (0.5%)	0	1 (0.2%)	2 (0.9)	0	2 (0.5)
GC	0	0	0	0	0	0
Chla	3 (1.5%)	3 (1.3%)	6 (1.4%)	1	1	2 (2%)

There were 451 women examined in 1996 and 434 in 2006 . Using test of proportion the significance of the fall in prevalence was calculated. There was a fall in total RTIs from 38% to 18% ($p<0.01$). The drop in prevalence of STIs from 15% to 6% ($p<0.01$) and endogenous infections from 28% to 18%($p<0.01$) was significant. Reduction in the proportion of trichomoniasis, bacterial vaginosis and candidiasis was also significant.

On analyzing the two arms separately, the fall in prevalence was significant in both arms for the following :

	ARM A			ARM B		
	P value	SE	95% CI	P value	SE	95% CI
RTI	< 0.02	4.4	15.2, 32.8	< 0.02	3.8	11.4, 26.6
STI	< 0.02	3.2	4.6, 17.4	< 0.02	2.3	3.4, 12.6
Trichomoniasis	< 0.03	3.1	3.8, 16.2	< 0.03	2.2	1.6, 10.4
Candidiasis	< 0.02	2.3	4.4, 13.6	< 0.02	2.1	2.8, 11.2

Hence both the health-aide arm and the doctor arm showed significant fall in infections. This study shows that using the health-aide to manage RTIs in the community is effective in reducing the prevalence of RTIs. Since she is more accessable and less expensive than the female doctor, considering the use of the health-aide to manage RTIs under constant monitoring and supervision is a useful strategy.

LIMITATIONS :

1) As there were multiple interventions introduced , it was difficult to identify which intervention worked best.

2) Laboratory data was not available for 2001. Since data on symptomatic prevalence was available, it was used and it showed a declining prevalence.

3) Difference of effectiveness between arms could not be calculated as they belonged to different populations.

CONCLUSIONS AND RECOMMENDATIONS :

This study demonstrates the effectiveness of a comprehensive community based intervention programme in reducing the prevalence of reproductive tract infections. Two levels of healthcare providers were used, namely the health-aide and female doctor. It was found that there was a fall in the prevalence of RTIs and STIs in the post-intervention period. This fall was significant in both the health-aide and the doctor arm. Among the factors analyzed respondents's education was found to have a significant influence on RTIs. Symptomatic diagnosis was not very appropriate in diagnosing RTIs.

Female literacy programmes and school health education should be emphasized. Couple dialogue should be encouraged for improved health-seeking. Diagnosis should not rely solely on symptoms reported,a clinical examination with minimal laboratory tests like wet preparation should be done. A community based intervention is recommended to reduce the prevalence of RTIs. If there is a shortage of doctors available to manage RTIs, the use of a health-aide can be considered. An earlier study on the cost-effectiveness of this strategy established the health-aide arm as less expensive than the female doctor for every extra case of syndromic cure. The health-aide has good rapport with the women and is more accessible to the community. Using the health-aide in the management of RTIs under constant monitoring and support will be effective, feasible, less expensive and will increase the trained man-power available to provide health services.

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